

10/10/17 "Its always too early to quit." -Norman Peale


HW: "2017 A2 CC L15 Solving Exponential Equations" finish
Test 2 on Monday 10/16

AIM: How do we solve exponential equations?

Warm Up:

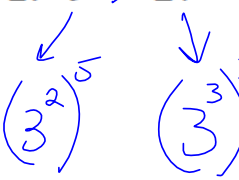
Please fill in the blank space with $>$, $<$, or $=$

1. $4^6 = 16^3$



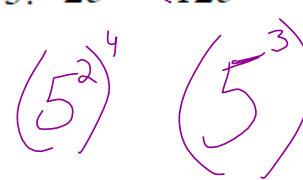
$4^6 = 4^6$

2. $9^5 > 27^3$



$3^{10} > 3^9$

3. $25^4 < 125^3$



$5^8 < 5^9$

A2 CC Complex Numbers Practice

Name _____
Date _____

1. For the complex number
- $-10+4i$
- , identify the real number and the imaginary number.

 -10 is the real $4i$ is the imaginary

2. Evaluate. a)
- $i^2 = -1$
- b)
- $i^3 = -i$
- c)
- $i^4 = 1$
- d)
- $i^0 = 1$
- e)
- $i^{11} = -i$
-
- $\frac{9}{4} = 2.25$
- $\frac{14}{4} = 3.5$

3. Write the expression as a complex number in standard form.

a) $(5+2i)+(3-2i)$

$8+0i$

b) $-i+(7-5i)-3(2-3i)$

$-i+7-5i-6+9i$

$1+3i$

c) $(-2+4i)+(3-9i)$

$1-5i$

d) $(-2+4i)-(3+9i)$

$-5-5i$

e) $(5-2i)-2(3+i)$

$5-2i-6-2i$

$-1-4i$

f) $3i(6-5i)$

$18i-15i^2$

$18i-15(-1)$

$18i+15$

$15+18i$

g) $i(2+i)$

$2i+i^2$

$2i-1$

$-1+2i$

h) $(2+3i)(1-4i)$

$2-8i+3i+12i^2$

$2-5i+12$

$14-5i$

i) $(-3+7i)(1-2i)$

$-3+6i+7i-14i^2$

$-3+13i+14$

$11+13i$

j) $(3-2i)^2$

$(3-2i)(3-2i)$

$9-6i-6i+4i^2$

$9-12i-4$

$5-12i$

k) $(2i)(1-4i)(1+i)$

$(2i-8i^2)(1+i)$

$(2i+8)(1+i)$

$2i+2i^2+8+8i$

$2i-2+8+8i$

$6+10i$

4. Solve each equation.

a) $x^2 = -60$

$\sqrt{x^2} = \sqrt{-60}$

$x = \pm i\sqrt{60}$

$\sqrt{4 \cdot 15}$

$i \cdot 2\sqrt{15}$

$\pm 2i\sqrt{15}$

b) $4x^2 + 20 = 0$

$\frac{4x^2}{4} = \frac{-20}{4}$

$x^2 = -5$

$x = \pm \sqrt{-5}$

$x = \pm i\sqrt{5}$

c) $6x^2 + 1 = -5$


$\frac{-1-1}{6} = \frac{-2}{6}$


$6x^2 = -6$

$x^2 = -1$

$x = \pm \sqrt{-1}$

$x = \pm i$

-  If the bases of an exponential equation are the same, then set the exponents equal and solve.

-  If the bases are not the same, try to re-write one or both of them in order to get a common base. (Use powers)

1. $2^{x+3} = 64$

$$\begin{array}{c} \downarrow \\ \textcircled{x+3} \quad \textcircled{6} \\ 2^{\quad} = 2^{\quad} \end{array}$$

$$\textcircled{x=3}$$

$$\begin{array}{r} x+3=6 \\ -3 \quad -3 \\ \hline x=3 \end{array}$$

2. $9^{2x} = 3^{3x+1}$

$$\begin{array}{c} \downarrow \\ (3^2)^{2x} = 3^{3x+1} \end{array}$$

$$\textcircled{4x} \quad \textcircled{3x+1} \\ 3^{\quad} = 3^{\quad}$$

$$\begin{array}{r} 4x = 3x + 1 \\ -3x \quad -3x \\ \hline \end{array}$$

$$\textcircled{x=1}$$

3. $4^x = 2^{3x+1}$

$$\begin{array}{c} \downarrow \\ (2^2)^x = 2^{3x+1} \end{array}$$

$$\textcircled{2x} \quad \textcircled{3x+1} \\ 2^{\quad} = 2^{\quad}$$

$$\begin{array}{r} 2x = 3x + 1 \\ -3x \quad -3x \\ \hline \end{array}$$

$$-x = 1$$

$$\textcircled{x=-1}$$

4. $27^x = 9^{2x-1}$

$$\begin{array}{c} \downarrow \quad \downarrow \\ (3^3)^x = (3^2)^{2x-1} \end{array}$$

$$\textcircled{3x} \quad \textcircled{4x-2} \\ 3^{\quad} = 3^{\quad}$$

$$\begin{array}{r} 3x = 4x - 2 \\ -4x \quad -4x \\ \hline \end{array}$$

$$-x = -2$$

$$\textcircled{x=2}$$

$$5. 9^{x+5} = 81^{2x+1}$$

$$8. \left(\frac{1}{2}\right)^x = 4$$

$$\left(\frac{2^{-1}}{1}\right)^x \quad \downarrow 2^2$$

$$2^{-x} = 2^2$$

$$-x = 2$$

$$x = -2$$

$$9. 5^{4x+2} = 1$$

$$5^{4x+2} = 5^0$$

$$\begin{array}{r} 4x+2=0 \\ -2 \quad -2 \\ \hline \end{array}$$

$$\frac{4x}{4} = \frac{-2}{4}$$

$$x = -\frac{1}{2}$$